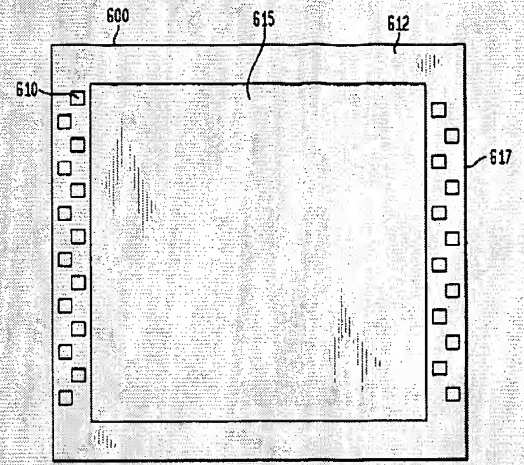


9	US 20020011863	US-PGPU	20020131	39
10	US 20020001869	US-PGPU	20020103	23
11	US 20020000815	US-PGPU	20020103	15
12	US 20010030370	US-PGPU	20011018	41
13	US 20010007375	US-PGPU	20010712	23
14	US 6607942 B1	USPAT	20030819	9
15	US 6586955 B2	USPAT	20030701	16
16	US 6586822 B1	USPAT	20030701	13
17	US 6583444 B2	USPAT	20030624	21
18	US 6465893 B1	USPAT	20021015	45
19	US 6465878 B2	USPAT	20021015	25
20	US 6460245 B1	USPAT	20021008	17
21	US 6433419 B1	USPAT	20020813	42
22	US 6392306 B1	USPAT	20020521	41
23	US 6372527 B1	USPAT	20020416	43
24	US 6350668 B1	USPAT	20020226	19
25	US 6309915 B1	USPAT	20011030	26
26	US 6284563 B1	USPAT	20010904	25
27	US 6271469 B1	USPAT	20010807	51
28	US 6181569 B1	USPAT	20010130	19
29	US 6133627 A	USPAT	20001017	42
30	US 5950304 A	USPAT	19990914	41
31	US 5852326 A	USPAT	19981222	43
32	US 5848467 A	USPAT	19981215	42
33	US 5714800 A	USPAT	19980203	8
34	US 5685885 A	USPAT	19971111	44
35	US 5679977 A	USPAT	19971021	40
36	US 5258330 A	USPAT	19931102	26
37	US 5148265 A	USPAT	19920915	28

FIG. 11



9	US 20020011003	US-PGPU	20020131	39
10	US 20020001869	US-PGPU	20020103	23
11	US 20020000815	US-PGPU	20020103	15
12	US 20010030370	US-PGPU	20011018	41
13	US 20010007375	US-PGPU	20010712	23
14	US 6607942 B1	USPAT	20030819	9
15	US 6586955 B2	USPAT	20030701	16
16	US 6586822 B1	USPAT	20030701	13
17	US 6583444 B2	USPAT	20030624	21
18	US 6465893 B1	USPAT	20021015	45
19	US 6465878 B2	USPAT	20021015	25
20	US 6460245 B1	USPAT	20021008	17
21	US 6433419 B1	USPAT	20020813	42
22	US 6392306 B1	USPAT	20020521	41
23	US 6372527 B1	USPAT	20020416	43
24	US 6350668 B1	USPAT	20020226	19
25	US 6309915 B1	USPAT	20011030	26
26	US 6284563 B1	USPAT	20010904	25
27	US 6271469 B1	USPAT	20010807	51
28	US 6181569 B1	USPAT	20010130	19
29	US 6133627 A	USPAT	20001017	42
30	US 5950304 A	USPAT	19990914	41
31	US 5852326 A	USPAT	19981222	43
32	US 5848467 A	USPAT	19981215	42
33	US 5714800 A	USPAT	19980203	8
34	US 5685885 A	USPAT	19971111	44
35	US 5679977 A	USPAT	19971021	40
36	US 5258330 A	USPAT	19931102	26
37	US 5148265 A	USPAT	19920915	28

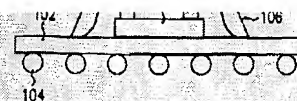


FIG. 1a  
(PRIOR ART)

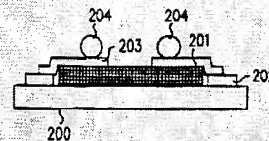


FIG. 1b  
(PRIOR ART)

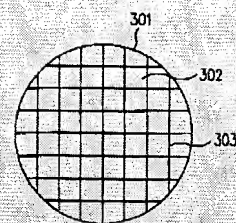


FIG. 2

10	US 20020001869	US-PGPU	20020131	39
11	US 20020000815	US-PGPU	20020103	23
12	US 20010030370	US-PGPU	20011018	41
13	US 20010007375	US-PGPU	20010712	23
14	US 6607942 B1	USPAT	20030819	9
15	US 6586955 B2	USPAT	20030701	16
16	US 6586822 B1	USPAT	20030701	13
17	US 6583444 B2	USPAT	20030624	21
18	US 6465893 B1	USPAT	20021015	45
19	US 6465878 B2	USPAT	20021015	25
20	US 6460245 B1	USPAT	20021008	17
21	US 6433419 B1	USPAT	20020813	42
22	US 6392306 B1	USPAT	20020521	41
23	US 6372527 B1	USPAT	20020416	43
24	US 6350688 B1	USPAT	20020226	19
25	US 6309915 B1	USPAT	20011030	26
26	US 6284563 B1	USPAT	20010904	25
27	US 6271469 B1	USPAT	20010807	51
28	US 6181569 B1	USPAT	20010130	19
29	US 6133627 A	USPAT	20001017	42
30	US 5950304 A	USPAT	19990914	41
31	US 5852326 A	USPAT	19981222	43
32	US 5848467 A	USPAT	19981215	42
33	US 5714800 A	USPAT	19980203	8
34	US 5685885 A	USPAT	19971111	44
35	US 5679977 A	USPAT	19971021	40
36	US 5258330 A	USPAT	19931102	26
37	US 5148265 A	USPAT	19920915	28

Details Text Image HTML

Ready

[75] Inventor: Patrick K. Thompson, Mass. Att.

[73] Assignee: Motorola, Inc., Schaumburg, IL

[21] Appl. No.: 619,401

[22] Filed: Mar. 21, 1996

[51] Int. Cl.<sup>6</sup>: H01L 25/48; H01L 23/12; H01L 23/14; H01L 23/32

[52] U.S. Cl.: 257/686; 257/700; 257/752; 257/777; 257/686; 257/690; 257/692

[54] Field of Search: 257/693, 700-703, 783, 792, 666, 666-696, 711, 777, 778, 782

[56] References Cited

U.S. PATENT DOCUMENTS

5,041,883	1/1992	Peng et al.	257/700
5,126,813	6/1992	Takahashi et al.	257/783
5,148,268	9/1992	Khandroo et al.	257/664
5,148,266	9/1992	Khandroo et al.	257/666
5,227,232	7/1993	Lee	257/666
5,378,300	11/1993	Khandroo et al.	437/309
5,315,466	5/1994	Pillay et al.	257/783
5,318,248	6/1994	Lee	257/783
5,381,047	1/1995	Kanno	257/783
5,402,318	5/1995	Omata et al.	257/700

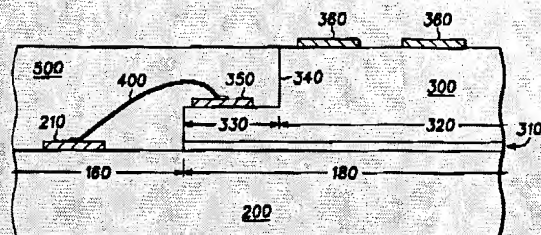
5,402,318 5/1995 Omata et al. 257/700  
5,401,302 5/1995 Hamada et al. 257/675  
5,324,975 6/1994 Davis 257/664

Primary Examiner—Tom Thomas  
Assistant Examiner—Alexander Oscar Williams  
Attorney Agent, or Firm—Sheple William Dore

ABSTRACT

A method of forming an integrated circuit assembly having a stepped interposer (300), an integrated circuit die (200) and an encapsulant (500). The stepped interposer (300) includes a central portion (320) having a plurality of contact regions (340), and a peripheral region (330), completely surrounding the central region (320), having a plurality of bonding regions (360). Some of the contact regions (340) are electrically coupled to some of the bonding regions (360). The integrated circuit die (200) includes a plurality of bonding pads (210) located around its periphery. The stepped interposer (300) is fixedly coupled to the integrated circuit die (200) and some of the bonding pads (210) are electrically coupled to some of the bonding regions (360). The stepped interposer (300) of the present invention provides contact regions (340) free from encapsulant (500) and added protection for wirebonds (400) or any other means of electrical coupling.

16 Claims, 3 Drawing Sheets



Details Text Image HTML

Full

NUM



9	US 20020011663	US-PGPU	20020131	39
10	US 20020001869	US-PGPU	20020103	23
11	US 20020000815	US-PGPU	20020103	15
12	US 20010030370	US-PGPU	20011018	41
13	US 20010007375	US-PGPU	20010712	23
14	US 6607942 B1	USPAT	20030819	9
15	US 6586955 B2	USPAT	20030701	16
16	US 6586822 B1	USPAT	20030701	13
17	US 6583444 B2	USPAT	20030624	21
18	US 6465893 B1	USPAT	20021015	45
19	US 6465878 B2	USPAT	20021015	25
20	US 6460245 B1	USPAT	20021008	17
21	US 6433419 B1	USPAT	20020813	42
22	US 6392306 B1	USPAT	20020521	41
23	US 6372527 B1	USPAT	20020416	43
24	US 6350668 B1	USPAT	20020226	19
25	US 6309915 B1	USPAT	20011030	26
26	US 6284563 B1	USPAT	20010904	25
27	US 6271469 B1	USPAT	20010807	51
28	US 6181569 B1	USPAT	20010130	19
29	US 6133627 A	USPAT	20001017	42
30	US 5950304 A	USPAT	19990914	41
31	US 5852326 A	USPAT	19981222	43
32	US 5848467 A	USPAT	19981215	42
33	US 5714800 A	USPAT	19980203	8
34	US 5685885 A	USPAT	19971111	44
35	US 5679977 A	USPAT	19971021	40
36	US 5258330 A	USPAT	19931102	26
37	US 5148265 A	USPAT	19920915	28

FIG. 8C

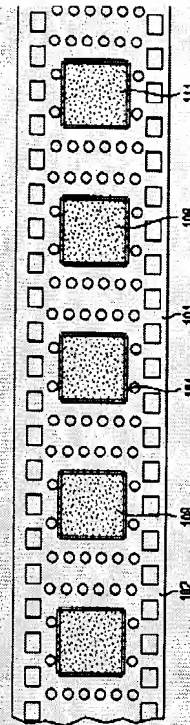


FIG. 8D

